TENTATIVE DETERMINATION TO EXTEND VARIANCE FOR COMBINED SEWER OVERFLOW DISCHARGES TO ALEWIFE BROOK/UPPER MYSTIC RIVER BASIN

FACT SHEET

This document is intended to provide a summary of the activities that have taken place since the Mass. Department of Environmental Protection's ("DEP") issuance of the CSO Variance for the Alewife Brook/Upper Mystic River Basin, and to provide a frame of reference for DEP's decision to extend the Variance for a period not to exceed three years, to September 1, 2010.

I. Background on CSO Control and Variances

Original CSO Variance and Conditions

A three-year Variance for CSO discharges to the Alewife Brook/Upper Mystic River Basin was issued by DEP on March 5, 1999. The Variance is a short-term modification of the Water Quality Standards issued by DEP subject to approval by the U.S. Environmental Protection Agency ("EPA"). The Variance allows limited CSO discharges from the outfalls along the Alewife Brook/Upper Mystic River permitted to the Massachusetts Water Resource Authority ("MWRA") and the cities of Cambridge and Somerville, subject to specific conditions. Other standards and criteria of the receiving waters' Class B designation are unaffected and remain in force.

The CSO Variance was issued in 1999 to allow time for DEP to obtain the information necessary to determine the appropriate long-term water quality standard and level of CSO control for the Basin, while ensuring that recommended CSO controls approved by DEP would be implemented. The Variance required the implementation of the cost-effective CSO control actions included in MWRA's Final CSO Facilities Plan and Environmental Impact Report, July 31, 1997 (the "FEIR") and also required other actions necessary to properly assess pollutant loads in the Basin and minimize the impact of CSO discharges.

The March 5, 1999 Alewife Brook/Upper Mystic River Basin Variance included specific conditions on activities of the MWRA and the cities of Cambridge and Somerville. These included requirements to implement the CSO control plan in the 1997 FEIR in the Alewife Brook/Upper Mystic River Basin; monitor and estimate CSO activations and volumes; prepare and submit a report on the CSO abatement benefit of infiltration and inflow (I/I) reduction programs; implement and report on water quality sampling programs in the Alewife Brook/Upper River Mystic Basin, including in-stream and stormwater sampling; and submit a Reassessment Report summarizing information gathered during the Variance process and reassessing the costs and benefits of additional CSO controls in the Alewife Brook/Upper Mystic River Basin, up to and including elimination of CSOs.

The required Reassessment Report was intended to provide the basis for a final determination on the appropriate long-term level of CSO control. On December 14, 2001,

MWRA submitted a request to DEP to extend the Alewife Brook/Upper Mystic River Basin Variance for 18 months and defer the requirement for the CSO Reassessment Report until July 1, 2003. After review of public comments on the MWRA request, DEP agreed that an extension was reasonable and necessary to complete the data collection and technical reports required under the Variance and on May 5, 2002, extended the Variance to September 5, 2003.

CSO Control Plan Reassessment

During early design efforts to implement the 1997 CSO control program, the City of Cambridge and MWRA collected new information that showed the extent of Cambridge's combined sewer system in the Alewife Brook watershed exceeded what was documented in the 1997 FEIR. A previously unknown CSO outfall, CAM401B, was also discovered. The MWRA subsequently determined that the CSO activations and volumes in this basin greatly exceeded the estimates in the 1997 FEIR, and that the 1997 recommended plan, at an estimated total cost of about $14 million, could not achieve the recommended level of control.

To address this new information, MWRA and Cambridge completed a reevaluation of the original CSO control plan for Alewife Brook and on April 30, 2001, filed a Notice of Project Change ("NPC") with MEPA. While the level of CSO control for the revised plan is comparable to the original 1997 plan and remains essentially one of targeted sewer separation, certain elements of the original plan, including areas slated for separation, were substantially modified, resulting in a change in expected impacts and mitigation measures, including measures to mitigate the effects of higher stormwater discharges on flooding of Alewife Brook. The projected cost of the project also increased significantly, from $14 million in the 1997 plan to approximately $100 million, based on most recent estimates. Notably, sewer separation associated with the CAM004 outfall will require construction of a new stormwater outfall to convey flows to a new wetland detention basin proposed within the MDC Alewife Reservation.

The revised Alewife Brook CSO control project is predicted to have the following benefits:

- 85 percent reduction in annual CSO volume discharged in a typical year;
- compliance of CSO discharges with Class B water quality standards 98.5% of the time;
- improved stormwater quality resulting in a reduction in stormwater pollutant loads; and
- creation of additional wetlands and enhancement of walking trails in the Alewife Reservation.

In the September 15, 2001 Certification on the NPC, MEPA required that MWRA and Cambridge prepare and file with MEPA a comprehensive Response to Comments document (the "RTC"). On May 30, 2003 MWRA and Cambridge filed the RTC. The recommended plan now includes a larger stormwater detention basin in the Alewife Reservation (including on-site wetland replication and Compensatory Flood Storage) that has additional benefits related to habitat, public access, recreation, and public education. The work in the Alewife Reservation has been coordinated with staff from the MA Department of Conservation and Recreation (DCR).

The reassessment of predicted peak separate stormwater flows from the separation project indicates that there will be a "slight decrease to the flows to Alewife Brook after project implementation." DEP concurred with the revised CSO abatement plan as a suitable substitute for the original plan, given the changed conditions. However, DEP reserved judgment on the final level of CSO control and water quality standard until sufficient information was compiled during the course of the CSO Variance.

Final Variance Report (CSO Reassessment) and Further Variance Extension

On July 1, 2003, in accordance with Section C. (1) of Alewife/Upper Mystic CSO Variance, MWRA submitted to DEP and EPA the Final Variance Report for the Alewife Brook and Upper Mystic River. This report provided detailed technical and financial information to support the long-term CSO abatement plan in the Alewife/Upper Mystic watershed. In the Final Variance Report, MWRA reported that additional CSO controls beyond those included in their revised CSO plan would not be cost-effective and would not provide meaningful water quality improvement, primarily due to the predominance of non-CSO pollution sources. Based on the technical and financial analyses included in the Final Variance Report, MWRA contended that the criteria needed to support a $B_{(cso)}$ classification was met, and MWRA requested that DEP take such administrative action.

During public review of the Final Variance Report, several advocacy groups and other stakeholders requested that DEP allow additional time for review and comment on this critical document. It also became apparent that there would be insufficient time to provide for this extended public review, to resolve outstanding technical issues relating to public and agency review, and to make administrative water quality standard determinations in this watershed within the time frame required under the first Variance extension. Due to these factors, and with public support, DEP again formally extended the CSO Variance, from October 1, 2003 to September 1, 2004. EPA issued written comments indicating that it was not in opposition to the second Variance extension.

This second Variance extension maintained most of the conditions included in the previous CSO Variance, and MWRA, Cambridge, and Somerville remained responsible for implementing the Nine Minimum Controls, monitoring CSO discharges, implementing the cost-effective CSO measures included in the recommended plan from the NPC, and implementing a receiving water monitoring program.

After the Final Variance Report was issued MWRA presented additional information on its financial capability analysis, incorporating into the analysis the costs of housing in the Boston metropolitan area.

II. Level of CSO Control

Following issuance of the last variance extension, local system evaluations were conducted by Cambridge and Somerville, working cooperatively with MWRA. Updated information on each community follows.

Cambridge:

The City of Cambridge has for several years been collecting detailed information on the configuration and performance of its sewer and storm drain systems, which are mostly combined. Cambridge has used this information to develop a detailed Hydroworks model of its sewer system, which includes conditions in MWRA's downstream interceptor system, as well as portions of the Somerville system that are hydraulically related to the performance of Cambridge's system. With the new information and detailed model, Cambridge has been able to assess the performance of its systems and update and confirm the frequency and volume of CSO discharges for a range of wet weather conditions. Cambridge has also used the information to support the implementation and verification of the extensive sewer separation work it is pursuing. In addition to the implementation of the MWRA's CSO control plan, the City is moving forward with actions to aggressively address private inflow removal in the CAM400 and CAM004 areas, which is necessary to fully eliminate these CSO discharges. The City is also eliminating common manholes in the Alewife watershed, which will eliminate another potential source of cross connections between the sewer and drain systems.

Cambridge's modeling results support the assessments and recommended plan predictions in MWRA's CSO control plan. The City's July 2006 Alewife Sewer System Assessment concludes that the MWRA plan, along with the private inflow and common manhole work, comprise the most cost effective and efficient CSO abatement program.

Somerville:

Somerville has completed a number of studies of their sewer system, including the two phase Tannery Brook Drain Evaluation (CSO SOM001A) and these reports provided a more detailed characterization of the Somerville combined sewer system, and evaluated the potential for additional CSO controls beyond those included in the MWRA CSO Control Plan. The reports also assess excessive I/I in areas within the City. These reports did reinforce the benefit of enlarging the connection between the City's Tannery Brook Drain and MWRA's Alewife Brook Interceptor, a component of MWRA's Long Term Control Plan.

DEP is continuing to review the information in both the Cambridge and Somerville Infrastructure Reports, other related sewer and drainage plans, and progress of the CSO abatement work. This information will be considered during the course of the CSO Variance to determine if higher levels of CSO control are feasible.

MWRA Long-Term CSO Control Plan

The recommended plan to control CSO discharges to the Alewife Brook and the Upper Mystic River is part of MWRA's region-wide Long-term CSO Control Plan ("LTCP") that addresses 84 CSO outfalls discharging to Boston Harbor and its tributaries. MWRA's capital budget for the LTCP has risen from $487 million in 1997, when MWRA issued the FEIR which was the basis for DEP's determination to issue the original CSO variance for the Alewife Brook/Upper Mystic River on March 1, 1999, to $811 million in MWRA's current Capital Improvement Program. Much of the additional cost is due to enhancements to the plan that increase the level of CSO control or overcome site-specific hurdles to maintain the

recommended levels of control. Following issuance of the FEIR, site-specific issues led MWRA to conduct reassessments of several of the recommended projects in order to ensure that CSO goals would be met. As mentioned above, the plan's cost significantly increased with the revised recommended plan for the Alewife Brook.

In August 2005, MWRA recommended a revised region-wide LTCP that included a schedule for implementing the revised plan for Alewife Brook. In March 2006, MWRA reached agreement with EPA, DEP and the U.S. Department of Justice ("DOJ") on the plan and a new schedule. The agreement was filed with the Federal District Court as part of a joint motion to amend the court schedule in the Boston Harbor Case (D. Mass. C.A. No. 85-0489).

In April 2006, the Court allowed the joint motion and issued an Order with a new schedule. Under the Order, MWRA has until the year 2020 to complete the remaining CSO work and subsequent monitoring to verify that the long-term CSO control goals are achieved. In addition, the United States and MWRA agreed to withdraw the February 27, 1987 Stipulation of the United States and the Massachusetts Water Resources Authority on Responsibility and Legal Liability for Combined Sewer Overflows and replace it with a Second Stipulation that requires MWRA to implement the CSO requirements set forth in the court schedule and to meet the levels of control described in MWRA's LTCP. In July 2006, the Court accepted revisions to Schedule Six incorporating a new Schedule Seven. The revisions include modified or additional milestones for projects in the Alewife Brook, Charles River and East Boston CSO plans.

The recommended CSO control plan for Alewife Brook/Upper Mystic River includes the following projects, shown in Figures 1 and 2:

Completed Improvements

- Upgrades to the Somerville Marginal CSO Treatment Facility (affecting the infrequent discharges at outfall SOM007A/MWR205A), which MWRA completed in 2001 at a cost of $4.0 million;
- Somerville manhole separation and closing of outfalls SOM001, SOM002A, SOM003, SOM004, SOM006 and SOM007, which City of Somerville completed in 1997 at a cost of $500,000 funded by MWRA;

Scheduled Improvements

- Separation of common manholes in the CAM400 tributary area and closure of the outfall to CSO discharges;
- Construction of a new stormwater outfall and vegetated stormwater detention basin to ensure that the separated stormwater flows from the CAM004 area will not worsen flooding along Alewife Brook;

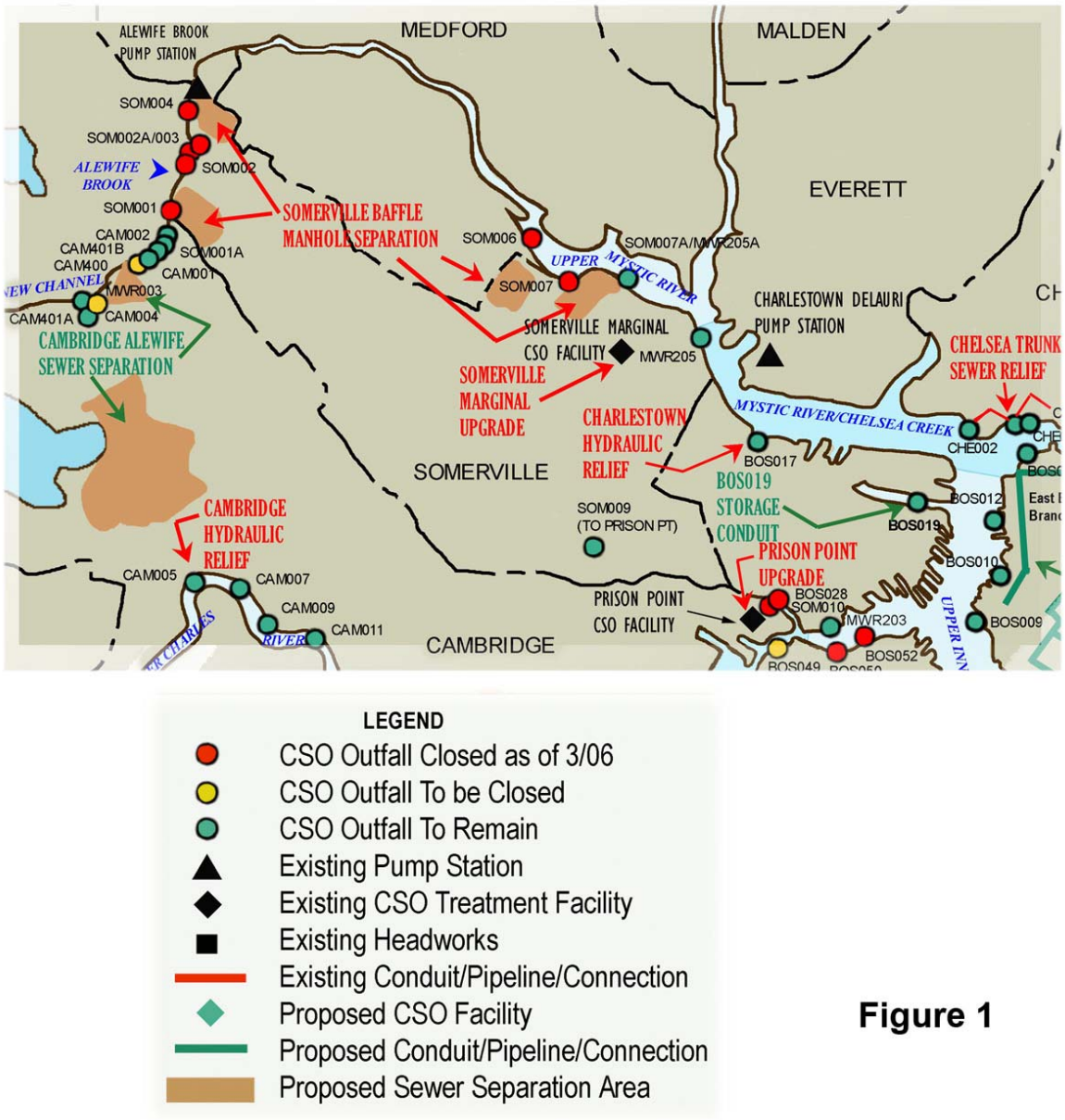


Figure 1

- Sewer separation in the CAM004 area and closure of this outfall to CSO discharges. Initial phases of this work have been completed by the City of Cambridge with MWRA funding and have significantly lowered CSO discharges to Alewife Brook
- Relief of interceptor connections at regulators associated with outfalls CAM002, CAM401B and SOM01A and floatables controls at these outfalls;
- Floatables control at outfalls CAM001 and CAM401A; and
- Construction of an overflow control gate and floatables control at outfall MWR003 and relief of MWRA's Rindge Ave. Siphon.

These scheduled improvements are estimated to cost approximately $100 million, which would be funded by the MWRA and the City of Cambridge. The MWRA's budget for these remaining improvements is $54 million.

Actual and Anticipated CSO Reductions

MWRA, with the cooperation of the cities of Cambridge and Somerville, has reduced CSO discharges and impacts to the Alewife Brook and Upper Mystic River through efforts that have begun to implement the long-term CSO control plan. These completed efforts include upgrade of MWRA's Somerville-Marginal CSO treatment facility; separation of common sewer and storm drain manholes to eliminate CSOs at several outfalls permitted to the City of Somerville; and construction of storm drain and sewer trunk lines downstream of the CAM004 sewer separation areas, along Fresh Pond Parkway.

Somerville's work to separate common manholes has resulted in the elimination of untreated discharges at outfalls along the Upper Mystic River and the closing of several CSO outfalls along the Alewife Brook. The only remaining CSO outfall along the Upper Mystic River is outfall MWR205A/SOM007A, which discharges CSO flows treated during a limited number of wet weather events at the Somerville Marginal Facility at a point upstream of Amelia Earhart Dam during high tide. At lower tides, the treated flows are discharged to tidal waters below the dam, at outfall MWR205. MWRA reported that outfall MWR205A/SOM007A discharged six times during 2006, which had above average rainfall. The long-term control plan goal is 2 activations in an average rainfall year.

Construction completed to date has already reduced CSO activations and discharges along the Alewife Brook. Activation frequency has decreased from 63 to 25 in a typical rain year and discharge volume has decreased from 50 million to 34 million gallons.

Long-term Performance

MWRA's recommended plan is predicted to reduce annual CSO volume to Alewife Brook/Upper Mystic River by 85% in a typical year, from 50 million gallons to 7.3 million gallons. CSO activations in a typical year will be reduced from 63 to 7. At the recommended control levels, CSO discharges will comply with Class B water quality criteria 98.5 percent of the time. Levels of CSO control at outfalls on the Alewife Brook for baseline (1997), current (2006) and revised recommend plan conditions are shown in the table below.

Cost of the Long-term CSO Control Plan

The cost of the Alewife Brook/Mystic River CSO control plan has grown from $13.8 million when incorporated into Schedule Six to approximately $100 million for the current recommended plan. The seven-fold increase in cost is due to engineering investigation of the Cambridge sewer system revealing the extent of required sewer separation was substantially greater than originally assumed, higher unit costs for installation of new storm drain and other elements of the work, and the need for a new outfall and stormwater detention basin required to manage the increase in separate stormwater volumes that were not included in the original plan. While the revised plan will control a greater quantity of CSO flow than the 1997 plan, no

Table 1: CSO Discharges at Alewife Brook Outfalls in a Typical Year

Outfall	Baseline Condition[1]		Current Conditions[2]		Long-term CSO Control Plan[3]	
	Activations	Volume	Activations	Volume	Activations	Volume
CAM001	1	0.01	1	0.01	5	0.19
CAM002	7	1.57	9	2.39	4	0.69
MWR003	1	0.06	2	0.08	5	0.98
CAM004	63	24.10	10	11.66	Closed	-
CAM400	10	0.80	9	1.22	Closed	-
CAM401A	7	2.74	6	2.21	5	1.61
CAM401B	25	10.50	22	10.85	7	2.15
SOM001A	10	9.89	9	10.00	3	1.67
SOM001	Closed		Closed		Closed	
SOM002A	Closed		Closed		Closed	
SOM003	Closed		Closed		Closed	
SOM004	Closed		Closed		Closed	
Total Alewife	63	49.70	22	38.42	7	7.29
SOM007A/MWR205A	11	6.72	2	0.06	3	3.48
SOM007	2	0.04	Closed		Closed	
Total Upper Mystic	11	6.76	2	0.06	3	3.48

(1) Updated estimates from the April 2001 Notice of Project Change (NPC).

(2) From MWRA modeling of 2006 system conditions.

(3) From model predictions in Final Variance Report (Alewife) and 1997 FEIR (Upper Mystic). Construction of the long-term CSO control plan for Boston Harbor and its tributaries is scheduled to be complete by December 2015, which will be followed by a period of post construction monitoring in accordance with Schedule Seven of the Boston Harbor Case.

increase in water quality benefits compared to the 1997 plan will be realized from this massive increase in cost.

Implementation Schedule

All projects included in the MWRA CSO Control Plan for the Alewife Brook/Upper Mystic watershed have been included in the implementation schedule for the federal court order, known as "Schedule Seven." However, delays associated with wetlands permitting for the Cambridge Park Drive Drainage Project (Contract 12) have ensued which have affected the project schedule.

The Authority currently estimates that the five projects constituting the long-term CSO control plan for Alewife Brook, including CAM004 stormwater outfall and detention basin (Contract 12), CAM400 manhole separation, interceptor connection relief and floatables control at CAM002, CAM401B, SOM01A and CAM001, CAM004 sewer separation, and MWR003 control gate/floatables control and MWRA Rindge Avenue siphon relief have to date experienced delay of at least 15 months beyond the Schedule Seven milestones due to the wetlands permit appeal.

Other Priorities to Ensure Continued Progress

Further water quality improvements in the Alewife Brook/Upper Mystic River watershed will rely largely on municipal efforts to address illegal discharges to storm drains, storm water

Best Management Practices and other storm water impacts as they contribute to wet weather issues affecting these watersheds. DEP recognizes that progress is continuing to be made in these areas.

DEP also acknowledges the importance of proper operation, maintenance, and rehabilitation of both the MWRA and community sewer and storm water systems to assure optimized conditions for conveying wastewater flows through the system for treatment and discharge at Deer Island and improving storm water quality. Sewer system repairs and cleaning have resulted in improved conveyance capacities in a number of locations and have also contributed to mitigating CSO discharges by addressing localized system flow constraints.

III. Proposed Variance Extension and Next Steps

As part of the agreement on the LTCP reached in March 2006 among EPA, DEP, DOJ and MWRA, MWRA requested that the Variance for the Alewife Brook/Upper Mystic River Basin be reissued through 2020 when MWRA must complete the region-wide LTCP and subsequent monitoring to verify that the long-term CSO control goals are achieved. MWRA bases this request on the work completed to date to achieve a high level of CSO control at certain outfalls, the expectation for significant CSO control and water quality improvement with the remaining CSO projects in the Alewife Brook CSO control plan, and the desire to provide a level of financial certainty and stability for its ratepayers.

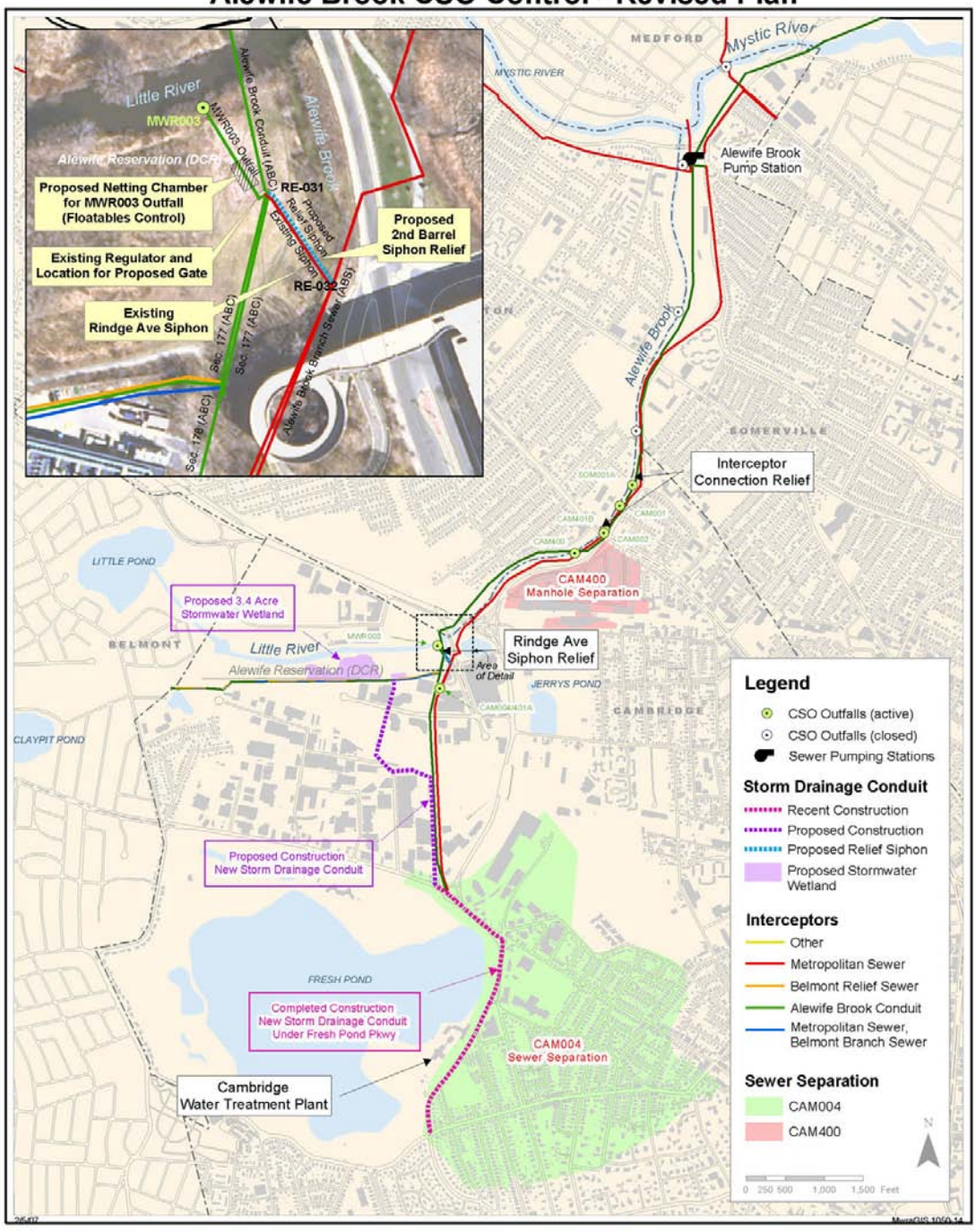
Substantial and Widespread Social and Economic Impact

DEP has emphasized cost-effectiveness for CSO long-term control plans, to ensure that financial resources for pollution abatement actually provide improvements in water quality. The principles of cost-effectiveness and water quality benefits have been a major factor used by MWRA in the development of its present $811 million CSO abatement plan. MWRA will spend more than $400 million on CSO projects over the next eight years (2007-2015), which is 29% of all planned capital spending and 53% of wastewater capital spending in the same period. MWRA sewer rates are among the highest in the nation and are projected to increase significantly over the next eight years.

Implementation of the revised recommended plan will reduce CSO discharges to the Alewife Brook to a level that will allow attainment of Class B water quality standards 98.5% of the time. In accordance with DEP's CSO Guidance, cost-effectiveness, protection of sensitive uses, and the financial capability of CSO permittees are all important factors in making determinations on the appropriate level of CSO control.

MWRA submitted data related to DEP's finding of "substantial and widespread economic and social impact," the basis for its issuance of a Variance in 1997 (See 314 CMR 4.03(4)(f)). DEP documented for the current Variance ending October 1, 2007, its review of a report by Robert N. Stavins, Assessment of the Economic Impact of Additional Combined Sewer Overflow Controls on Households and Communities in the Massachusetts Water Resources Service Area, dated March 17, 2004. DEP also reviewed the Affordability Analysis Worksheets included in Appendix H of the Cottage Farm Report dated January 2004, which are based on EPA's Interim Economic Guidance for Water Quality Standards.

Figure 2
Alewife Brook CSO Control - Revised Plan



DEP's conclusions from its review of the documents submitted by MWRA and determination in support of the Variance Extension request have not changed. DEP, upon issuance of the 2004 Variance Extension, indicated that it would evaluate the information required by the Variance to determine whether there are additional cost-effective CSO controls. DEP has reviewed the new information regarding revisions to the Alewife Brook/Upper Mystic

River CSO plan, as well as other revisions and cost changes in MWRA's LTCP, and has determined that additional controls beyond those recommended in the MWRA CSO Plan would not be cost-effective or affordable.

Based on these important considerations, DEP has determined that proceeding at this time with controls beyond those included in the MWRA Long-Term CSO Control Plan would result in substantial and widespread social and economic impact as specified in 314 CMR 4.03(4), and that an extension to the CSO Variance is appropriate at this time. Issuing of the CSO Variance Extension in the Alewife Brook/Upper Mystic River watershed is consistent with EPA Guidance: *Coordinating CSO Long-Term Planning with Water Quality Standard Reviews (July 31, 2001)*, which asserts that longer term variances and renewal of variances are warranted given the extended duration necessary for implementation of LTCPs.

Determination to Extend Variance

DEP makes the following determinations:

- The MWRA CSO control plan for the Alewife Brook/Upper Mystic River, which includes projects to optimize sewer system performance and remove stormwater inflow through sewer separation, are responsive to the conditions and intent of the Variance and will achieve substantial CSO control benefits.

- MWRA has completed numerous analyses since the late 1980s evaluating alternatives for eliminating CSOs from the collection system tributary to the Deer Island Wastewater Treatment Plant. Among these are the 1997 FEIR, the April 30, 2001 Notice of Project Change, and the July 2003 Final Variance Report. MWRA's revised LTCP incorporates all cost-effective and feasible CSO abatement projects for this watershed. At this point in time, it does not appear technically feasible to eliminate all CSO outfalls to this watershed given the engineering and infrastructure constraints in the MWRA interceptor system, headworks, conveyance tunnels, the Deer Island wastewater treatment plant, and the ocean outfall.

- Proceeding at this time with controls beyond those presently included in the revised LTCP would result in substantial and widespread social and economic impact as specified in 314 CMR 4.03(4). The cost of MWRA's CSO control program is substantial, at present included in MWRA's capital budget at $804 million and estimated by MWRA to ultimately cost $864 million to complete the plan on schedule, including escalation to the mid-point of construction and contingency. MWRA's detailed financial impact assessment considered the effect of expected sewer rate increases, and, appropriately, median household income as adjusted by the relatively high cost of housing in the Boston area. The MWRA adequately demonstrated that proceeding at this time with CSO controls necessary for full attainment of Class B water quality standards in the Alewife Brook/Upper Mystic River watershed would result in substantial and widespread economic and social impact.

DEP concludes that extension to the CSO Variance for the Alewife Brook/Upper Mystic River watershed is appropriate at this time, and extends the CSO Variance for MWRA, and the cities of Cambridge and Somerville to September 1, 2010. A determination on the highest feasible level of CSO control and associated water quality standard is deferred until the LTCP is implemented and the associated benefits are verified in 2020, in compliance with Schedule Seven.